

THE
ANNUAL REPORT

OF THE
CANAL COMMISSIONERS

OF THE
STATE OF NEW-YORK,

Presented to the Legislature, the 24th February, 1823.

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REPORT, &c.

To the Legislature of the State of New-York, in conformity with the act, entitled "an act respecting navigable communications between the great western and northern Lakes, and the Atlantic Ocean," passed April 15th, 1817, the Canal Commissioners most respectfully report :

That the success of their labours during the last season, has been as great as could reasonably have been expected. Boats have actually passed, upon the Erie canal, for the distance of more than two hundred and twenty miles. A part of this great length of canal line, not having been prepared to admit the water until late in the fall, has not produced any revenue from tolls. And as it has suffered in several places, the usual effects of soakage in earth of a very porous description, and of the pressure of a considerable head of water upon newly constructed banks, it is not anticipated that it will be in a condition for profitable use, until after the lapse of several weeks in the spring. It is probable that in the month of April, tolls will begin to be received, on two hundred miles of this canal, and that, before the end of June, the whole line, from Rochester to Schenectady, will be navigable.

The place of connection, between the canal and Lake Erie, has always been regarded as of much public importance. Repeated acts of the legislature have been passed relating to it. In April last, a law

was passed, entitled " an act to authorise and encourage the construction of harbours at Buffalo creek and Black Rock ;" and the agency required of the Canal Commissioners, under this law, as well as by previous statutes, occasioned a meeting of their board, to be held at Buffalo, early in June last. At that meeting, it was determined, that Peter B. Porter, and his associates, be advised, that if they succeed, in a fair experiment, by constructing ten or more rods of the pier, on the plan submitted by them, at some point nearly central between Brace's store-house and the second angle east from Bird Island. by the first day of May or June next, to the satisfaction of the Canal Commissioners, that they will then contract with them for making a basin or harbour, according to their proposition ; or recommend to the legislature, to pass a law refunding the costs of such experiment ; and that the acting Canal Commissioner, on the western part of the Erie canal, be advised to put under contract, the canal line from Little Buffalo creek, to some point nearly opposite to Bird Island, this season.

This determination was made in consequence of the existence of some doubts, in the minds of the Commissioners, as to the conditions, upon which alone, they were authorised to take definitive measures, in respect to either of the proposed harbours ; and in the belief that it was their duty to obtain the benefit of actual experiment, as far as was practicable, in relation to several essential points, on which their engineers, and other intelligent gentlemen, had

expressed different opinions. One effect of the course adopted by the meeting at Buffalo, was to postpone the ultimate decision of the harbour question, for one year ; and this, it was thought, would not involve any public injury, because the harbour, at either place, might, notwithstanding the postponement, be completed within the two seasons yet required to complete the canal through the Mountain Ridge. In the mean time, the citizens of Buffalo have had the opportunity of completing their works ; and the people of Black Rock, in consequence of the intimation afforded them, by the above determination, have constructed about sixteen rods of pier, in the rapid waters below Bird Island, for the purpose of testing experimentally, the permanency of a mole which, on their plan of a harbour, must be extended from Bird Island to Squaw Island.

The canal line from Little Buffalo creek to the upper end of the proposed Black Rock harbour, being nearly two miles in extent, has been placed under contract, and the execution of these contracts has advanced with reasonable rapidity, and will undoubtedly be completed before next winter.

In the course of the last season, further examinations have been made, along the margin of the Niagara river, and up the Tonnewanta creek, on both sides, from its mouth, to the place where it is intersected by the canal, for the purpose of understanding, as well as possible, all the facts and circumstances which can affect the location and construction of our

works. Ever since the first survey caused to be made, by the Canal Commissioners, of the country west of Genesee river, it has been deemed practicable, to turn the head waters of the Tonnewanta creek, from a point above the falls thereof, northerly into the Oak Orchard creek. Mature reflection, and a further knowledge of localities, long ago convinced them, that some important advantages would be secured by effecting this object. The towing path along the bank of the Tonnewanta creek, especially towards its mouth, together with all the other artificial works, and the adjacent lands, would be less liable to damage from floods, and the navigation would be saved from the inconvenience of having to encounter a rapid current, during the continuance of high water. But the most material advantage connected with this operation, would result from its enabling us, to pour into the canal, at a point more than twenty miles east of Lockport, where it will be very much wanted, a durable feeder.

The Oak Orchard creek is the principal outlet of the Tonnewanta swamp, and where it crosses the canal line, it is sometimes so extremely diminished, by the droughts of summer, as to be, for any purpose of navigation, hardly worth the cost, which would be necessary to carry it into the canal. Enlarged as it will be, by introducing into its channel the upper waters of the Tonnewanta, it will always be a considerable stream; and its floods may be made to pass down its rocky bottom, under the canal, without the smallest danger. After a careful

and minute survey, the most suitable route for opening a channel, for the Tonnewanta to pass into the Oak Orchard creek, and for the latter to flow into the canal, was determined upon; and the whole work was let out, to competent contractors, to be executed within the present year, with a view of accomplishing the desirable object of extending the canal navigation as far west as Lockport, in the spring of 1824. It is believed, that this feeder, taken into the canal nearly central, on the extensive level between the Genesee river and the mountain ridge, with the aid of the Genesee river, will afford, at least, a partial supply of water for the whole season.

In the month of December last, contracts were executed for making a towing path on the banks of the Tonnewanta creek, and for building a dam near its mouth. It is also contemplated, during the next season, to build a lock near the dam, to enable boats to pass into the Niagara river. If this work is finished next season, boats may then pass down the Niagara river, by means of this lock, into the Tonnewanta creek; and, by a portage of seven miles, across the mountain, communicate with the canal east of Lockport: and thus, a valuable use of the waters, both east and west of the mountain ridge, will be insured for one season, before the immense labor required at that place can be performed.

About ten miles of the canal line, on the margin of the Niagara river, remains to be put under con-

tract ; and it is intended to divide this into suitable sections, and place it in good hands, early in the ensuing season.

While the canal commissioners were at Buffalo, in June, many representations were made to them, tending to shew the impossibility of carrying on the excavation of rock, at the mountain ridge, for the contract prices. The rock is shelly, and more difficult to remove, by blasting or otherwise, than was anticipated. And it was perfectly apparent that the work at that place, where it was of the greatest importance to advance it with all possible celerity, would soon fail entirely, if a new course was not adopted. In this state of things, the canal commissioners determined to have the work go on with energy. The men who had taken the contracts for rock, were regarded as men of business and good contractors, and it was agreed to continue them upon their jobs ; the largest of these, however, was divided into three parts, two of which were, by agreement, placed into new hands. The work was then to be conducted in the following manner :— The contractors were to employ as many hands as the commissioners should require ; and a minute account was to be kept, by an assistant engineer, of all the expenses necessarily incurred in the prosecution of the work. The assistant engineer was to be constantly on the contracts, and to inspect the whole course of operations. He was to keep an account of the men employed every day, and of their wages and subsistence ; of the powder used ; of the amount

of iron and steel required, and the blacksmiths' bills; of the horses and oxen employed, and their keeping; of all the tools, utensils, and every other thing necessary to a full knowledge of the actual expenditure on each job; and the contractors were to be paid reasonable wages for their services.

Under this system, the work has been conducted with much more vigor than it was before. And the passage through the mountain ridge, which will doubtless be the last labor to be done in the construction of the Erie canal, will be all cut and completed before the end of the year 1824.

In the worst two miles of this great ridge, originally there were probably about 260,000 cubic yards of rock to be excavated, of which 55,226 yards were taken out before the middle of December last, and about 97,400 yards of earth have been excavated upon the same two miles. At the western extremity of these two miles, the earth above the rock, is found to be twelve feet in depth, and the rock dips towards the south west; it is therefore probable, that the extent of rock excavation along the bottom of the canal, will be considerably less than was expected, when the contracts were taken. This diminution of quantity, will, in some degree, counterbalance the unforeseen cost of excavation per yard, which has varied, since the account of expenditure has been kept, as above mentioned, from about eighty cents to more than double that sum, giving an average not far from nine shillings and six

pence. This average has been much increased, by including the excavation, between the first of November and the fifteenth of December last, when the weather was extremely bad, and the expense of excavation was more than fifty per cent. greater than it had been in the preceding months. Since the fifteenth of December, we are informed, by one of our engineers, who is stationed at that place, the work has again advanced with less expense.

The excavation of rock is not suspended during the utmost severity of winter, though there are less hands engaged upon it now, than there were in all the warmer months. Perhaps it may be advisable in the spring, after all the experience then acquired, respecting the management and cost of this concern, to place the excavation of rock again upon the ground of a specified price per cubic yard. The ridge contracts, west of the rock, though of great extent, and subject to many embarrassments, have advanced so as to sanction the belief that they will be finished before the rock contracts.

From the mountain ridge to the Genesee river, the contracts are in such a state of forwardness as to afford assurance, that they may all be completed before the next winter. On this part of the canal the grubbing and clearing are mostly done; so are nearly all of the small culverts, of which there are a large number. There are also a few large culverts, which have their foundations laid, and such progress has been made in the superstructures, as

to leave no doubt that they may be completed in two months after the opening of the spring. Some progress is also made on most of these jobs, in the excavation and embankment.

Within twenty miles of Rochester, west of the Genesee river, several sections are already accepted, and all of them will be ready for the introduction of water, before the first of July. These twenty miles might have been completed, last fall, if that had been necessary. But as they could not be used, until supplied with water, from the Genesee river, and, as it was desirable that a large proportion of the laborers to be hired in the country, should be employed at Lockport, and in its vicinity, it was deemed good policy to keep at work, upon them, a less number of hands than would otherwise have been required.

The greatest mass of mason work contained in any one structure, on either of the canals, will be in the aqueduct across the Genesee river. This work was to have been completed, by the first of October last, according to agreement. But the agreement could not be performed, partly on account of the great extent of the work, and partly because the labor of quarrying and cutting the stone, was much greater than had been expected. Several stone quarries, which were easily accessible, and were supposed to contain stone of good quality, were necessarily abandoned, after some expense of time and money, upon them, because the

stone, when exposed to the air, were found unfit for use. And the only quarry from which stone, suitable for a great portion of the work, could be obtained, was covered, to the depth of from six to fourteen feet, with hard earth. Much labor was, therefore, necessary to quarry them, and when quarried, they were so hard and silicious, as to make it very expensive and laborious to cut them.

In the fall of the year 1821, one of the piers of this aqueduct had been laid, from the foundation, about two feet high. This work consisted of large stone, in courses about a foot thick; and each stone was fastened to the rock, on which it rested, by iron bolts, passing about one foot into the rock below, and secured by fox-wedges. These stones were afterwards cramped together. The next spring, no vestige of this work remained, except the iron bolts, in the bottom; and these were bent down, with the course of the stream, so as to present the least possible resistance to any substance put into motion, and carried down with the current. This pier was in the most rapid and exposed part of the channel, and possibly would have proved sufficient, if the work had been carried above the utmost rise of the waters. As it was, it served to impress us with juster views of the prodigious violence and power of the stream, in time of floods. And this impression we have constantly carried with us, in our subsequent labors.

At the place from which our work had been re-

moved, instead of commencing again on smooth and level rock, as had been the case, in the first instance, we excavated an oblong square into the bottom, six inches deep, of the exact size required for the pier, and then placed a course of very large stone, which were two and a half feet thick. These stone were secured to the rock, by larger bolts than had been used before, and they were strongly connected together by large bars of iron sunk into the stone, and extending round the pier, on the top of the course, and then secured to each stone, by several bolts. In addition to these means of strength, besides filling the work with water proof grout, each end of the pier had a bar of iron crossing it diagonally, and let in, and bolted like those before mentioned: so that it is deemed impossible for the pier to be removed, by water, in pieces. It must remain stationary, or all be swept away at once. The next courses above, consist also of very large stone, secured by bars and bolts, like the lower course. In this manner, all the piers and abutments are made; except that it was not thought necessary to sink the foundations of those which are less exposed to the violence of the stream, six inches into the rock at the bottom. The piers and abutments are all completed, and connected together by nine massive arches of excellent masonry, each having a span of fifty feet. The whole work is now raised to the top of the arches, so that nothing remains to be done before it will be complete, but the parapet walls, lining, and coping: And the stone for these are all quarried and cut, and many of them delivered.

The manager of this contract assures us that it will be ready for acceptance within two months after the commencement of proper weather for mason work.

The feeder from the Genesee river, and the contracts remaining unfinished, the year before, in that vicinity, having all been inspected, about the first of July last, the canal was filled with water, from Rochester to Pittsford. And with the exception of a little time, when the water was taken out for the purposes of repair, that portion of the line was navigable all the season afterwards.

The great embankment at Irondequot, was not in a condition to admit the water so early as had been hoped. When it was raised nearly to its required height, it was impossible to employ as many teams and hands upon it, as had before been used. And a mass of fresh earth, raised gradually by human labor, to an elevation of more than seventy feet, will at all times, settle very much, as you approach the top. These causes, with the severe illness of the contractor, who had the embankment in charge, disabled us from passing the water through it, till the 14th of October last.

Much solicitude was felt, and every exertion made to complete this work as early as July; for besides the strong motive arising from the desire of extending the navigation to Rochester, it was expected that there would be a deficiency of water in the canal,

from Pittsford to the Seneca river, in the dryest part of the year, if aid could not be obtained from the Genesee river, and carried through the Irondequot embankment. This deficiency was experienced. The last season was the dryest ever known in the county of Ontario. And when the drought commenced, it was perceived that the great embankment could not be done in time for the exigencies of the canal, east of it. A feeder was, therefore, constructed from Mud creek into the canal, in May. This was very useful, for some time, but as the drought increased, it rapidly lessened, till in July, the quantity of water which it afforded, was so small, and so little aided from other sources, that navigation was no longer possible between Pittsford and the Seneca river.

After the waters of the Genesee river were permitted to flow through the great embankment, there was at once an active navigation on the canal, from Rochester to the Little Falls of the Mohawk, a distance of more than one hundred and eighty miles. And this navigation continued without interruption, till some time in December.

Much labor had been expended on the Cayuga marshes, during the last winter, but it was apparent, early in the spring, that the canal through them could not be finished under the most favorable circumstances, until the season should be far advanced. It was, therefore, thought advisable to make a temporary wooden lock, extending from the

canal, in the town of Galen, at a place where it was located within a hundred feet of the boatable waters of the Seneca river, into that stream. This was accordingly done, so as to be passable in May, from which time toll began to be collected on the western section of the canal.

At a meeting of the canal commissioners, held at Buffalo, as before mentioned, in June, in consideration of the incompleteness of the canal, and its inadequate supply of water, it was resolved that no more than half the usual rate of toll should be demanded west of Montezuma, while the water in the canal remained less than two and a half feet in depth. Accordingly, at that rate the toll was charged. The amount of toll collected, on the western section, at Lyons, Palmyra, and Rochester, notwithstanding all the circumstances above enumerated, was three thousand two hundred and eighty-six dollars. The same portion of the canal, during the next season, will probably produce fifteen thousand dollars, in toll.

The completion of our works, through the Cayuga marshes, has been attended with many troublesome and unforeseen contingencies. We had early drought, which we regarded as propitious. Still the labor necessary to keep out the water, where the line runs, several miles, through a porous and soft bog, and the natural surface of the contiguous streams, is from four to eight feet above the bottom of the canal, has been very great. And the impe-

diments to the performance of this labor, have been rendered much more distressing by the fact, that when the waters were lowest, and of course most easily excluded, the fear of sickness has been the most repulsive and insuperable. The excavation has also been much retarded and burthened by large quantities of quicksand, in situations where this material, at all places requiring much labor and expense to control, assumed its most unmanageable character. By great and persevering exertions, the excavation was so far completed, through this section of the canal, as to allow of the passage of a boat, the thirtieth day of July last, since which time it has been constantly open.

The water in the Seneca river, was reduced during the last autumn, more than a foot lower than it has been known to be in many years. And as, in places where the quicksand occurs, no exertions could entirely prevent it from rising in the bottom of the canal, some inconvenience was felt in the passage of heavy loaded boats, during the low water. This inconvenience was wholly removed, by a small rise of the stream, in consequence of the fall rains. And if it shall again present itself, it may be forever obviated, without any great expense, by the construction of a lock with a small lift, so located as to keep the waters over the quicksand from settling below the required height.

The middle section of the Erie canal has been navigable from April to December; as was that part

of the eastern section which extends from Utica to the Little Falls, with the exception of some interruptions, occasioned, chiefly, by a want of water, on the lower levels. There is a connexion, by means of a lock, from the new canal to the old one, and Mohawk river, at the German Flats. And for the purpose of using that connexion, the water was, for some time, passed down into the Mohawk, as well as through all the levels of the new canal. When experience demonstrated, that the quantity of water introduced from above, was insufficient to supply both routes, with navigation, it was thought advisable to confine it entirely to the new, which was afterwards adequately supplied.

It is a most gratifying circumstance, in relation to our great scheme of internal improvement, that after the lapse of two or three years, the banks of the canal become so well compacted, by the natural operations of time, and by use, that little expense of reparation is required. There has been no breach on the middle section, of any considerable importance, since our last annual report; and no boat has been stopped upon it, for a single day, in consequence of disorder in the works. The expense of superintending it, has, therefore, been small; and, at the same time, the amount of revenue derived from it, has exceeded our expectations.

The following account of articles which have passed the collector's office, at Rome, includes about three fourths of the tonnage on the middle section, during the last season, to wit :

*Articles passing on the Erie Canal at Rome, in 1822,
that are not enumerated in the books, or stated in de-
tail in the monthly returns.*

4552	boxes glass,	79	13	2	16
	lard,	47	18	0	2
	Butter,	91	14	3	13
	Hams,	30	3	2	27
	Cheese,	10	19	1	23
	Corn & other coarse grain,	288	15	0	27
	Apples,	7	12	2	0
	Flax and hemp,	4	2	0	3
	Flax seed,	46	6	2	8
	Household goods,	184	4	3	22
	Grass seed,	1	19	1	0
	Bees wax,	1	0	3	4
94	Wagons and carriages,	19	14	2	0
	Clay,	42	10	0	15
	Books,	1	10	1	20
2	Boxes patent wheel heads,	0	3	2	0
	Horns and horn tips,	2	5	2	9
1	box types,	0	2	2	0
	Window sash,	2	6	0	0
	Soap,	49	18	3	8
1	bbl. leaf tobacco,	0	1	0	0
	Furs and peltry,	4	19	0	4
	Hops,	7	12	3	25
	Wool,	10	14	2	7
2	Copper kettles,	0	9	0	0
	Brick,	116	15	0	21
263	bbls. ale and beer,	34	12	2	0
103	Ploughs,	5	3	2	0
	Gin,	13	9	2	0
	Honey,	0	4	3	0
190	bbls. cider,	23	16	0	0
	Peaches,	27	8	2	4
	Carried forward,				

Brought forward,					
	Feathers,	0	18	0	1
	Crackers,	0	15	0	0
	Vinegar,	1	7	2	0
	Cast iron scraps,	47	10	0	20
	Potatoes,	0	10	0	0
	Lead,	0	10	0	0
	Hay,	2	0	0	0
	Stone,	144	11	3	4
105	bbls. kelp,	15	1	3	22
	Empty casks,	7	1	2	0
	Meal and shorts,	103	15	2	0
	Sand,	12	7	0	0
	Iron ore,	85	0	0	0
	Ginseng,	0	8	2	0
	Wooden ware,	0	16	3	16
	Rags,	3	19	2	16
	Mechanics' tools,	0	9	0	0
3	church bells,	0	18	2	12
1	bbl. blood,	0	2	2	0
1	do. pickles,	0	2	2	0
	Paper,	0	12	2	27
	Nuts,	0	5	2	0
	Castings for machinery,	10	18	1	17
1	turner's lathe,	0	1	0	0
	Gun stocks,	1	0	0	0
1-2	barrel currant wine,	0	1	1	0
50	bundles scale boards,	0	5	0	0
	Maple sugar,	0	2	0	0
	Flags,	0	3	0	0
	Calf skins,	0	4	0	0
	U. S. gun carriages,	1	3	2	0
	Cotton and woollen machinery,	1	3	0	0
1	keg cherry juice,	0	1	0	0
130	water melons,	0	3	2	20
	Quinces,	0	6	0	0
	Crab apples,	0	3	0	0
2	boxes whips,	0	2	0	0
Carried forward,					

Brought forward,				
Oysters and clams,	2	17	0	0
58 bls. cider brandy,	7	5	0	0
2 do. peach do.	0	5	0	0
4 do. apple sauce,	0	10	0	0
Mustard seed,	0	5	0	0
Tallow,	0	19	0	14
2 Sacks deers hair,	0	1	2	0
17 Wheel barrows,	0	4	1	0
Tons,	1615	17	0	7
958 C. staves and heading,				
1,661 M. shingles,				
26 C. hoop poles,				
1,435,225 ft. boards and scantling,				
111,62~ ft. timber,				
37,676 posts and rails,				
25 cords bark,				
532 do. wood.				

Total amount of articles passing on the canal at Rome, in the year 1822, on which toll is charged by the ton.

184,522 bbls. flour,	18452	4	0	0
17,666 do. salt,	2523	6	0	0
9,495 do. provisions,	1356	9	0	0
4,872 do. pot and pearl ashes,	1218	0	0	0
366 do. oil,	45	15	0	0
98,174 bushels wheat,	2629	13	0	24
46,822 do. water lime.	1560	15	0	0
194,398 gallons whiskey,	648	0	0	0
Gypsum,	775	0	0	0
Merchandise,	4619	19	0	14
	33829	1	1	10
Amount of weight of sundries } brought down, }	1615	17	0	7
	35444	18	1	17

B. B. HYDE, *Collector.*

On the articles included in the foregoing statement, on boats, and all other articles, passing between the Little Falls and Montezuma, there has been collected in tolls, during the past year, the sum of

\$57,160 89

To which if we add amount collected

on western section, 3,286

And on Champlain canal 3,625 44

It makes, in the aggregate, \$64,072 33

An amount which will be seen to be above fifty per cent. greater than we ventured to estimate it in our last annual report. Should the amount of tolls increase the present year, in proportion to the increased extent of the navigation on the canals, which we are inclined to think it will, we may set down the amount at a sum exceeding one hundred thousand dollars.

The expenses of the middle section, during the the last season, embracing collectors', superintendents', and lock keepers' wages, and all repairs, have not exceeded eight thousand dollars.

At the Oriskany creek, where it intersects the line of the canal, and forms a part of the navigation, we have found it expedient to change the route of the canal, by passing it over the creek below the dam, by means of an aqueduct. This disconnects the canal from the creek, and the mills and manufactories around it, which were enabled to draw to their use, the waters of the canal, whenever the

creek failed to give them a full supply. The value of the water to these works,—the difficulty of ascertaining with certainty what they were justly entitled to,—and the strong inducements of private interest, to take the greatest quantity which could be justified under colour of right, threatened such serious interference with the navigation of the canal, as to render it advisable to make the abovementioned alteration. The work is nearly accomplished, and will cost from eight to ten thousand dollars.

Under the authority given to the canal commissioners, by the legislature, at their last session, they have proceeded to connect the Salina side cut with the navigable waters of the Onondaga Lake, and also to lower the said lake to the level of Seneca river. This last work has been completed; the former outlet has been deepened and enlarged, and a new cut giving a depth of water, at all times, of not less than three feet, has been excavated, from the lake to the river. This has rendered the navigation perfectly easy and convenient, to and from the river, lowered the level of the lake nearly two feet, and greatly facilitated the operations going on under the authority of the state, in ditching and draining the Salina marshes.

The excavation for the extension of the side cut is now in progress. The materials for the locks will be delivered, and in readiness for use, before the close of winter, and by the first of August next, it is expected that the whole work will be finished.

In reference to the Eastern Section.

The operations on this section have embraced the whole of the unfinished part of the line, extending from the Little Falls to Albany, a distance of eighty-six miles.

The importance of opening the navigation as speedily as possible throughout this portion of the canal, and connecting it with the navigable waters of the Hudson, not only on account of the accommodation which it would afford our western citizens, in removing the great obstacle to the transportation of their products to market, but also, for the purpose of increasing the income from the tolls, which had become necessary for the payment of the interest on the canal debt, was so obvious and pressing, as to induce the utmost exertions in forwarding the completion of this part of our great work.

During the winter every necessary preparation was made, and the first favorable weather of spring was improved, in commencing active operations along the line of the canal; and although considerable difficulty was experienced in procuring the requisite number of laborers, from four to seven thousand have been constantly employed throughout the season. The great amount of work which was to be accomplished at Devendorf's hill, at the Nose, and around Yankee hill, and which had excited much solicitude during the summer for its completion, was nearly done by the first of October; and by the middle of November the canal was so far

finished, that water was admitted into it, sufficient to navigate light boats, from the Little Falls to the flats of Schenectady, nearly sixty miles. Throughout this whole extent, the levels were proved to be correct, and the works in general strong and substantial. It was not, however, to be expected, that the first admission of water into such an extent of new canal, would be unattended with some failures; indeed, the extreme dryness of the season, the short space of time in which the banks were formed, without a fall of rain to wet and settle them, assured us that leaks and breaches were unavoidable. The greatest part of those which occurred, took place on the line between the Nose and Schenectady. On this part of the canal there is more light and porous soil, and more stone work, connected with embankments of earth that are liable to casualties of this sort, than on any other part of the canal hitherto constructed.

At the little Nose, a breach was made through the bank, and the wall which supported it on the river side, for some yards in length, was carried away; the water also broke through between the earth and masonry of several culverts and aqueducts, and in one instance passed through an embankment, around the head of a lock, doing no other damage however, than the removal of a few yards of earth, and the displacing of three or four plank in the chamber of the lock.

These injuries, which, in the whole, were neither great or discouraging, were promptly repaired, and

the water retained in the canal, until the banks were sufficiently saturated to cause them to settle gradually and compactly.

Some damage was sustained by an extraordinary fall of rain on the last of November, which, at the Little Falls, and in its vicinity, swelled the Mohawk to an unusual height, raised the waters in the canal in some places above its banks, and caused several small breaches: these have been mostly repaired, and the whole amount of injury occasioned by this flood, may be estimated at the sum of fifteen hundred dollars.

It will be necessary to carry a feeder from the Paper-mill creek into the Schenectady level. This work, together with that of lining the canal in several places, will occupy some time in the spring; and although the canal will be navigable as far eastward as the Nose, soon after the disappearance of the ice, it is not expected that boats will be able to reach Schenectady before the first of June.

A feeder from the Mohawk has been constructed at the Little Falls, which, embracing a part of the old canal, passes over the river by an aqueduct, and connects with the new canal, forming a navigable communication between the two canals, and through the old canal with the river, both above and below the Falls. The aqueduct is a handsome structure of hewn lime stone, consisting of three arches, with abutments and piers, resting on a foun-

dation of solid rock ; the centre arch of seventy feet chord, spans the river ; the other two are of fifty feet each ; under these the water never flows, excepting in floods ; at its ordinary height, the river passes under the main arch, with a swift current, twenty feet in depth. The whole work supports two parapet walls, four feet broad, four and a half feet in height, and measuring each two hundred and fourteen feet in length, and having a water way between them of sixteen feet. The estimated extra expense of constructing the feeder from the north, instead of the south side of the river, was defrayed by individual contribution. This consideration, together with that of accommodating a large population by an easy and convenient access to the canal, decided the conduct of the canal commissioners in regard to the plan and location of this work.

The dam at the Schoharie creek was completed in September. It is a work of considerable magnitude, measuring six hundred and fifty feet across a stream, which at times sweeps away almost every opposing obstacle. This is, however, a substantial work, founded on piles, and made solid with timber and stone ; and as it has an elevation of only eight feet, it is believed to be capable of resisting the force of the greatest floods.

The line of the canal passes the creek a few rods above the dam ; and while the water is raised to a height sufficient for the passage of boats, it flows through the guard lock on the east side, and gives to

the canal in that direction, an ample supply. Boats and horses, by means of ropes, windlasses, and scows, will be taken across the creek with safety and expedition.

Between the Little Falls and Schenectady, are the following structures, the principal part of which were completed during the last year, to wit :

Thirteen locks, built of lime stone, handsomely cut, and laid and grouted with water cement :

Eleven guard locks, built partly of hewn, and partly of well shapen rough stone, and laid in water cement :

Sixty culverts, of various sizes, of lime stone masonry :

Thirteen aqueducts, with piers and abutments of stone masonry, trunks of wood :

One hundred and five road and farm bridges—some of them with abutments of stone, but the principal part are built of timber and plank :

Six dams, of timber, filled in with stone, wings of stone masonry.

Beside the stone in the above works, there are one hundred and thirty thousand cubic yards, which have been used in sloping walls, to protect the

bank along the margin of the river, and in other places, where this kind of protection was deemed necessary.

Between Schenectady and Albany the work has been successfully prosecuted: five of the locks have been completed, most of the lock pits have been excavated, and the materials for the remaining locks are nearly all collected, and transported to the places where they are to be used. The abutment and piers for the upper aqueduct, have been carried up to the recess, which is to receive the braces for the wooden trunk; and the lower aqueduct is in such a state of forwardness, that it is believed that they will both be finished the ensuing season. All the culverts and waste weirs are under contract, and the materials for their construction will be collected during the present winter. The excavation and embankment on this part of the line, are in such progress, that, with a season as favorable as the last, it is confidently expected that boats may pass to the Hudson in November next.

In relation to the Champlain Canal.

The works on the Champlain canal, have been successfully prosecuted during the past season.—The excavation and embankment, together with the locks, aqueducts, and culverts, have been finished as far south as the village of Waterford, and the water admitted, so that loaded boats have passed through the whole line from Lake Champlain to Waterford.

The excavation south of the village of Waterford, to the Mohawk, is very considerably advanced, and the dam across the river below the Cohoes bridge, has been erected. On the admission of the water into the canal, although the banks were new, and had not settled into a firm and compact state, yet they did not, in any place give way.

The navigation in Wood Creek, had been found to be imperfect, in consequence of the rapidity of the current, and a deficiency in the depth of water, for two or three miles below Fort Ann. To remedy this inconvenience, a dam and wooden lock have been constructed in the creek, which are found to answer a very valuable purpose : indeed, the navigation in Wood Creek is now carried on with as much ease and convenience, except in high water, as it is in the canal.

By a reference to the last annual report, it will be seen that five engineers were sent by the board, to the summit level of the Champlain canal, during the last session of the legislature, in order to ascertain the best mode of supplying it with water.

They reported, that it would be more advisable to take the water from the Hudson, from above Glen's Falls, by a new feeder, than to repair the great dam at Fort Edward, which had been injured by the freshet of the 12th of November, 1821. The board concurred in this opinion, and Mr. Canvass White was sent early in the spring, to lay out the

new feeder. It was soon discovered, however, that the engineers who had examined the track of the feeder while there was a foot or more of snow upon the ground, had been very much deceived in the character of the excavation, the expense of the work, and the time necessary for its accomplishment. It was found that the feeder must pass for more than a mile in length, through a rock of secondary limestone, filled with chasms and fissures, which would require considerable time and expense to make sufficiently tight to hold water, and that a considerable part of the remainder of the line, must be located upon the margin of a declivity, composed of loose and porous sand, a portion of which would probably require lining, to make it secure. It was perceived that the difficulties to be encountered, would render it utterly impracticable to supply the canal with water through the new feeder, in one season.

These considerations, joined to a knowledge of the fact, that vast quantities of lumber had accumulated between White-Hall and Fort Ann, which without a supply of water, would be prevented for a year from going to market, to the great injury, if not utter ruin, of many of the owners, induced the canal commissioners while at Buffalo, to pass a resolution, authorising the great dam at Fort Edward to be repaired. The work was commenced, prosecuted, and finished with all possible expedition; so that by the first day of September the water was running over the whole length of this stupendous structure, affording a continuous sheet of more than nine hundred feet in extent: And from that time till

the navigation was interrupted by frost, the canal was furnished with a superabundant supply.

Although considerable injury was sustained in various parts of the country by the uncommon violence of the autumnal floods, yet this work did not receive the least damage ; and so many precautions have been taken to render it strong and permanent, that it is believed that the probability of its standing is as great as that of any dam on so large and impetuous a stream as the Hudson.

The toll collected during the short time that the navigation was open amounted to \$3,625 44. The following are the chief articles on which this sum was received, to wit: 444,058 feet of round and square timber, 15,047,681 feet of sawed lumber, 854,000 shingles, 20,000 staves, 8,000 hoop poles, 82 tons of merchandize, 8 tons of meal, 33 tons of marble, 30 barrels of whiskey, 1,800 cwt. of paint.

The works in the Hudson river between Troy and Waterford, consisting of a dam and sloop lock, are not completed. The masonry of the lock is finished ; but while the contractors were closing a space in the dam which had been left open to discharge the water of the river while the other works were in progress, a heavy fall of rain created a sudden and considerable rise in the river, which undermined and swept away about one hundred and twenty feet of the unfinished work, and the river was afterwards so much swelled by repeated rains, and the season so

far advanced, that it was found impracticable to complete it. After the spring floods subside, the work may be finished in two months, provided it is not interrupted by freshets, and provided the breaking up of the river shall do no further injury to it. The construction of dams across so large a stream as the Hudson, is always subject to casualties ; because it requires several months to complete so considerable a structure, and any intervening flood, will in general materially injure, or entirely destroy such parts of the work as are unfinished : nor can human skill or prudence effectually guard against such contingencies ; for no period can be selected, from the commencement to the completion of such a work, in which some of the parts are not necessarily incomplete, and consequently exposed to injury or destruction.

These works have already cost considerably more than it was originally supposed would complete them ; and from soundings recently taken, it is ascertained, that to complete the dam, it will be necessary to fill up a channel in the bed of the river, which has been excavated by the floods to such an extent as to give an average of thirty-one feet depth of water, and to encounter an additional expenditure of from \$20,000 to \$30,000. It would perhaps be improper at this time, to abandon a work upon which has already been expended about \$70,000 ; but it is the opinion of the canal commissioners, that should the floods of next spring occasion any serious additional injury, they ought to suspend any fur

ther expenditure, until they receive the advice and direction of the succeeding legislature.

The amount of canal expenditure, as appears from the last report of the commissioners of the canal fund, is now, \$5,603,386 85. And there will be wanted yet, to complete both of the canals, about two millions of dollars, to wit :

To complete the eastern section of the Erie canal, and the Champlain canal,	\$600,000
To complete the western section of the Erie canal, from Rochester to the moun- tain ridge,	400,000
To complete the canal through the moun- tain ridge, including rock and earth and locks,	750,000
To complete the canal from Tonnewanta creek to the waters of Lake Erie, in- cluding the feeder from the Tonnewan- ta and Oak Orchard creeks,	250,000
In all,	<hr/> \$2,000,000

Of this sum, about one and a half million of dollars ought to be expended, during the ensuing season; as, by that expenditure, it is believed the Champlain canal may be completed, and the Erie canal made navigable from Albany to Lockport, a distance of three hundred and twenty-five miles.

By the original estimates, the expense of the Erie canal, was calculated to be	\$4,881,738
Champlain canal,	871,000

Total estimate of both canals,	\$5,752,738
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The difference between the original estimates and probable expenditure, is \$1,850,648

From which deduct the following sums,
not included in the estimates, but taken from the last report of the commissioners of the canal fund, to wit :

For interest,	\$446,634
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Great western inland lock navigation company,	152,718
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Incidental expenses of commissioners of canal fund,	5,254
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In all,	604,606
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Leaving a residue of,	\$1,246,042
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And this residue may be accounted for, as follows,

1st. There was a mistake in our original estimate, as to the length of the canal line, between the Schoharie creek and Albany, of eight miles. In our report of March 18th, 1817, which contains the estimates, it was mentioned that we had not been able to procure a level and survey to be made, from the Schoharie creek to the Hudson. And the estimate was grounded chiefly upon former examinations of that part of the line, made by Mr. Weston, an Eng-

lish engineer. We set down the distance eight miles shorter than it was found to be, when the line was located and accurately measured. Each mile of that distance was estimated at fourteen thousand dollars, exclusive of bridges, culverts, engineers, &c. With these, the estimate was about seventeen thousand dollars per mile, amounting, in eight miles, to \$136,000.

2d. There was also a mistake of seventeen feet in the descent of the line from Schoharie creek to Albany, the fall being that number of feet greater than had been estimated. The lockage for each foot rise, was estimated at \$1,250, which for seventeen feet, gives \$21,250.

3d. Damages have been paid, on the claims of individuals along the line of both canals, to the amount of about \$100,000.

4. We have made the embankments almost universally wider than our original calculation. They were estimated to give thirty feet width of water, at the surface, generally, though several of them, to give less. They are mostly made so as to give forty feet width at the top water line; and this increase of width has cost, say, \$150,000.

5th. We have altered the character of our works, at several places, substituting, in many instances, stone, where wood had been estimated, and, in other instances, adopting better, but more expensive plans.

The most prominent of these alterations have applied to various places, on the valley of the Mohawk, where many more stone have been used than had been included in the estimates ; to the substitution of stone aqueducts, at Nine Mile Creek, and Ske-neateles creek, on the middle section, where cheaper materials, and other plans, had been originally deemed suitable ; and to the substitution of a stone aqueduct, with several necessary accompaniments of stone work, at the Genesee river, in place of a dam and guard locks, originally estimated as being sufficient for the purpose of carrying the canal across that stream. The additional expense of all these works, may be stated at \$100,000.

6th. The Champlain canal was at first intended to be only thirty feet wide at the top, and to contain three feet, in depth, of water. It has however been constructed of the same size with the Erie canal, to wit—forty feet wide at the top, with four feet depth of water ; and this increase of size would necessarily involve an additional expense of at least one third, which amounts to \$290,000

7th. Several alterations of the canal line, have been made, by which it has been shortened in the aggregate more than seven miles, exclusive of the mistake above alluded to. Some of these alterations have been less expensive than the original line. but several of them have been much more so, particularly at the Mountain Ridge. At that place, the alteration shortened the line more than two miles ;

but it was calculated that, upon the new line, we should have to encounter near a mile more of rock than would be found on the original line. This alteration was adopted, on account of the great saving in distance, and because, upon the rough examination, it was believed to be nearly, if not quite impossible, to construct the canal, and secure it, on about two miles of the old line, lying east of the rock, in consequence of the steep side hill upon which it must have been located, and the nature of the materials constituting the slope. It must be confessed, however, that the expense of excavating the rock is much greater than we expected. This unforeseen expense will probably amount to \$200,000.

8th. Several feeders have been made, and must be made, which were not at the beginning thought necessary; particularly those from the Hudson river into the Champlain canal, and that from the Tonnewanta creek, through the Oak Orchard, into the canal. These feeders, when perfectly introduced, will cost, say \$150,000.

9th. The expense of collecting tolls, of superintendence, and of all repairs on those parts of both canals which have been completed, and made ready for navigation, is included in the difference which we are here accounting for, and it amounts to about \$50,000.

10th. The canal fund, with what it has already paid, and must pay, for opening the connexion be-

tween the Salina side cut and the Onondaga lake, will be subject to a disbursement of about \$40,000, which necessarily makes a part of the above difference.

11th. The powers of certain commissioners to improve the navigation of the Hudson river between Troy and Waterford, were transferred to the canal commissioners about two years ago; and in the discharge of duties required by that transfer, an expense has been incurred, of about \$70,000.

The above causes of expenditure, unforeseen and not estimated in our original report, more than make up the difference between our estimate and the required expenditure. But, in addition to them, there are several others, of less importance, which have contributed to swell our disbursements. One of these ought here to be stated, because it has had already, and will continue to have, considerable effect; but it is the harbinger of so much good, that it must be regarded with the greatest complacency. We refer to the increased price of the means of subsistence, and consequently of the value of labor, in the western parts of the state, produced by the canal itself. It is believed, that giving to the country west of the Seneca river, the use of the canal, so far as it has already been completed, for transportation, has made the market price of wheat there, fifty per cent. greater than it would have been without the canal.

Taking into consideration all the circumstances attending the progress of the canals, and viewing them under the light of the experience already acquired, the commissioners have the satisfaction of declaring that their most favorable anticipations are confirmed, in relation to the practicability of making the canals, and of securing them, and in relation to their vast utility.

SAMUEL YOUNG,
MYRON HOLLEY,
HENRY SEYMOUR,
WM. C. BOUCK,
DE WITT CLINTON,
S. VAN RENSSELAER.

24 Feb. 1823.